Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

STATION PAPER NO. 46
June, 1957

.9622
.25T2
no. 2

FOREST PRODUCTS MARKETING

THE MARKET
for Domestic Charcoal in Wisconsin

LIBRARY
CURRENT SERIAL
JUL 30 1957
U.S. DEPARTMENT OF AGRICULTURE

by
John R. Warner
William B. Lord

LAKE STATES FOREST EXPERIMENT STATION
M. B. Dickerman, Director

FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE

F O R E W O R D

This report on the Market for Domestic Charcoal in Wisconsin is the second of a series on markets for forest products in the Lake States region. The first, issued in 1956, was on Wood Pallets in the Minneapolis-St. Paul Area: An Outlet for Low-Grade Hardwoods (Station Paper 43).

These market reports have the aim of helping to increase the utilization of wood residue and standing low-grade or cull timber. Although charcoal manufacture does not consume very large quantities, it is considered one of the better potential outlets for low-quality wood.

Reported shortages of domestic charcoal during the past several summers have stimulated development of a number of new private enterprises in the Lake States, and additional kilns are being built each year. Some concern has been expressed that the charcoal industry may be expanding too rapidly for the prospective demand. A study of the market situation therefore appears timely.

236041

C O N T E N T S

	Page
FOREWORD. . . . . (Inside front cover)	
BACKGROUND OF CHARCOAL USE AND PRODUCTION IN U. S. . .	3
CHARCOAL RETAIL OUTLETS IN WISCONSIN	6
DISTRIBUTION TO CHARCOAL RETAILERS	9
PRODUCT FORM AND PACKAGING	11
CHARCOAL SALES AND CITY SIZE	13
SUMMARY AND CONCLUSIONS.	14

THE MARKET FOR DOMESTIC CHARCOAL

IN WISCONSIN

by

John R. Warner and William B. Lord[1/]

A rejuvenated charcoal industry is developing rapidly in the Lake States in response to home or domestic[2/] demand for charcoal. This firm and expanding market provides an encouraging outlook for moderately increased use of the lower grade hardwood components of the regional forest resource as well as for fuller utilization of wood residue.

Presently, the domestic use of charcoal is not large, but it is growing rapidly. During 1955 an estimated 2,500 tons of charcoal, equivalent to approximately 7,000 cords of wood, were consumed in Wisconsin. This was about 50 percent more than was used the year before.

The intent of this study of the domestic market for charcoal in Wisconsin is to describe the present status and trends in the market so that overall information is available to the industry during this period of development.

The first phase of the work is reported here in a description of the market. At a later date the results of a recent national charcoal production survey that are applicable to Wisconsin, together with an analysis of charcoal sales volume, price, and market trends for the State, will be reported.

1/ Research Foresters at the Lake States Forest Experiment Station. The Station is maintained at St. Paul 1, Minnesota, by the Forest Service, U. S. Dept. of Agriculture, in cooperation with the University of Minnesota. The authors are grateful for constructive reviews of this paper by Edward Beglinger of the Forest Products Laboratory, Madison, Wis.; and by Paul H. Lane and Charles E. Boldt of this Station.

2/ Refers primarily to charcoal used as a consumer's good.

The information contained in this paper has come largely from retail stores in typical communities throughout Wisconsin. A number of individuals in manufacturing, selling, and wholesale supply within the industry provided information so that the market situation might be accurately described.

The following report first reviews briefly the national history of the production and use of charcoal, and then considers the retail outlets in Wisconsin, the wholesale distribution system, the production form and packaging, and the relation of sales to city size.

Background of Charcoal Use and Production in the United States

Early in the Nation's history charcoal was used principally for smelting iron. It dominated this field from 1619 when the first iron furnace was constructed near Jamestown until about 1855 when coal generally replaced it in the smelters. During this time perhaps 90 to 95 percent of the charcoal manufactured was used in the iron furnaces. The annual consumption of wood by kilns supplying this demand has been estimated at more than 1,700,000,000 board-feet by 1840--a larger volume than was consumed in that year by the lumber industry[3/]. This era could be considered the first phase of the charcoal industry. Charcoal was the only product and kilns were the primary production facility (fig. 1).

Figure 1.--Two of a battery of beehive kilns which operated until early in this century near Marquette, Mich., supplying charcoal for smelting iron.

3/ Day, Ralph K. 1929. Forests follow the charcoal burner. Empire Forester, pp. 55-61, illus.

The industry's second phase began in 1830, overlapping the use of charcoal in iron smelting, with the rise of industries devoted to the destructive distillation of wood. Charcoal was a secondary product of these elaborate plants, which were concerned primarily with converting vapors and tars recovered during carbonization into chemicals for industrial use. This phase flourished during the early years of the 20th Century, reaching its peak about 1920 when more than 100 plants were in operation. Its decline followed the discovery of cheaper methods of synthesizing its primary products: acetone, acetic acid, and methanol. By 1932 half of the hardwood distillation plants had closed. Today, only 6 remain in the entire United States,2 of which are located in the Lake States.

The industry now is in a third phase. Charcoal has again become a primary product and the kiln an important production unit. During the past 5 years the domestic use of charcoal has increased far beyond expectations, more than offsetting the steady decline in industrial accounts. There is some evidence that growth in domestic demand may have started before World War II, when a major automobile manufacturer made a sustained effort to promote charcoal use by making it readily available in dealers' showrooms throughout the country. If so, these early efforts were frustrated by the war, for increased use did not become apparent until about 1950.

The speed of transition from predominantly industrial to domestic use of charcoal is illustrated by the experience of one manufacturer with an annual conversion capacity of about 100,000 cords. In 1950, this producer sent 90 percent of his charcoal into industrial channels, only 10 percent into domestic use. In 1956, 50 percent of the plant capacity was channeled into supply of the domestic market.

The present national status of the charcoal industry is revealed by recent estimates of the Forest Products Laboratory[4/]. National charcoal production is nearly 375,000 tons. Approximately 60 percent of the total is sold in the domestic fuel and recreational market. The remaining 40 percent finds uses in metallurgical, chemical, and pharmaceutical industries. Sixty-five percent is produced in large distillation plants and 35 percent in kilns.

4/ Unpublished data, Forest Products Laboratory, U. S. Forest Service, at Madison, Wis.

The increasing demand for domestic charcoal and temporary shortages in scattered areas have led inevitably to construction of new kilns. Some have been built, or their construction was stimulated, by the large charcoal manufacturers; some have sprung up as independent enterprises.

There are no nationwide authoritative estimates of the rate of kiln construction or of the number in operation as of any recent date. However, the increase in numbers of briquetting machines provides an indication of the rate of expansion. Prior to 1951 there were 3 or 4 briquetting plants active in commercial charcoal manufacture, while in the closing weeks of 1956 at least 15 were operating in 10 States, and several others were in the planning stage. Twelve of these newly constructed plants are being supplied with charcoal produced in kilns; the other three obtain their supplies largely from wood distillation plants. The high construction rate can be illustrated further by the number of kilns springing up in Michigan, Minnesota, and Wisconsin. Since 1950, 122 units have been put into operation with a total capacity per burn of over 780 cords of wood, and there are plans for additional units in each State (fig.2).

Figure 2.--This is an experimental kiln developed by the Forest Products Laboratory and constructed for testing by the Lake States Station on the Upper Peninsula Experimental Forest near Marquette, Mich. It is being studied not only from a structural standpoint, but also as a tool for the forester in achieving improvement of forest stands.

Charcoal Retail Outlets in Wisconsin

As in the rest of the Nation, relatively little charcoal was sold for domestic use in Wisconsin 5 years ago. Today consumption for the State exceeds one pound per person per year and probably totals in excess of 5,000,000 pounds annually.

This pronounced increase in charcoal consumption has resulted from the rising popularity of outdoor cooking and picnicking. Use has been highly seasonal because it is so closely tied with outdoor recreational pursuits and leisure time.

Charcoal retail outlets are changing rapidly. Fuel and lumber dealers have traditionally been the most important distributors of charcoal on the domestic market because of its major historical home use for heating and cooking by low-income urban groups. The recent growth in recreational or luxury demand for charcoal has provided steady pressure for more efficient, convenient retail distribution. The first new outlets to exploit this growing demand were hardware stores, whose early interest was linked with new lines of grills which were being placed on the market. Other retailers soon followed until demand eventually became so widespread that a variety of store types could be found with charcoal for sale. Significantly, grocers, although among the last to display charcoal on their shelves (most of them sold charcoal for the first time in 1954), now predominate as retail outlets. Beyond convenience, the important factor here is the association of food, particularly meats, with the new use of charcoal (fig. 3). In the important vacation areas of northern Wisconsin many sporting goods stores sell substantial volumes of charcoal. Here convenience for vacationers is an important contributing factor to high sales volume.

The 1954 Census of Business lists 47,884 retail establishments. Contacts with retail stores throughout Wisconsin in 1955 indicated that an estimated $6\frac{1}{2}$ percent (3,100) of these stores sold charcoal during that year. Grocery stores comprised more than half of all charcoal dealers; hardware stores accounted for another 25 percent, fuel and lumber dealers 9 percent, sporting goods stores 5 percent, and all other outlets combined 9 percent (table 1, pg. 8).

Figure 3.--
Charcoal display
in a chain
supermarket.

The story varies somewhat for volume of sales. Fuel and lumber dealers and grocers each sold an estimated 35 percent, hardware dealers about 20 percent, and a variety of other store types the remaining 10 percent.

These proportions are shifting rapidly in favor of grocery and hardware outlets. Grocery stores are in an especially fortunate position for not only can they attract with lower prices due to rapid turnover and higher sales volume, but they also have the inherent asset of favorable product association which places them in a highly desirable competitive position. Of course, this changing pattern of retail distribution is in response to a changed and growing demand, and although the new retail market structure is clearly evident, it will still be a number of years before stability is achieved.

Table 1.--Number and relative importance of stores selling charcoal by store type in Wisconsin, 1955

Store type	Number of stores in State 1/	Stores selling charcoal (estimated)		
		Number	Percent of: All stores of this type	Percent of: All charcoal retailers
Grocery	5,956	1,600	26.9	52
Hardware	1,827	770	42.1	25
Fuel & Lumber	1,611	290	18.0	9
Sporting Goods	324	160	49.4	5
Liquor and Beer	10,376	100	1.0	3
Drug	1,185	50	4.2	2
Department & Dime	6,331	40	.6	1
Surplus	2/ 300	20	6.7	1
Filling Station	4,916	20	.4	
Other	15,058	50	.3	2
Total	47,884	3,100	6.5	100

1/ According to 1954 Census of Business.
2/ Estimated.

Distribution to Charcoal Retailers

The supply of charcoal has not expanded as fast as has domestic demand. Two results of this expansion are evident. First--prices, both at wholesale and at retail, have risen noticeably. Second--delayed, reduced, and refused orders have become more frequent in distribution channels. This latter situation has been sufficiently irritating to encourage an estimated 10 percent of the State's retailers to secure more than a single source of charcoal supply.

The wholesaling structure is changing just as is the pattern of retail distribution, but is doing so more slowly. The delay is due, in part, to the market transition difficulties of wood distillation plants. Lack of storage facilities is the key problem (fig. 4). The variety of wholesalers demanding charcoal during the summer season of high use nearly equals the number of store types that retail the product. Each year their sales volume increases, thus increasing the pressure on producers to change their distribution channels. These pressures have been largely resisted because none of the new wholesalers has shown any inclination to warehouse charcoal when the season of high use declines.

Figure 4.--The acuteness of the charcoal storage problem confronting wood distillation plants is illustrated by the size of these mounds of charcoal stored on the grounds of a large manufacturer.

Large producers understandably favor their present channels of distribution--those giving priority to markets that remain steady throughout the year. Large-scale industrial users receive first consideration, and then the producers' established brokers. These brokers have accounts among fuel dealers, wholesale houses, and larger local industrial users in their territory. When the element of seasonal shortage in supply exists, as it does today, they naturally favor their older, time-tested accounts. Thus the tendency is strong all the way down the line to retain the prevailing system of charcoal distribution, making it difficult for newcomers to obtain supplies in other than established market channels.

The strong position of fuel and lumber dealers in the present domestic charcoal market is directly attributable to the relatively unchanged wholesale market structure. Their early importance as distributors established their ratings firmly with brokers; and a rapidly growing list of new customers, together with an ability to warehouse in excess of immediate needs, has maintained their strong position. Through control of existing charcoal supplies at a time when sales to individuals were expanding rapidly, many of them effectively established themselves as wholesalers to retailers whose supply of other goods comes through completely different channels.

The present position of fuel and lumber dealers may be temporary and transitional, for it has produced some inefficiencies, notably repeated handling by market middlemen. Several examples could be given--but one, in an urban area of southeastern Wisconsin, illustrates the point. Charcoal sold by a chain of independent grocers was shipped to them from their cooperatively-owned warehouse, which in turn was supplied by a local fuel and lumber dealer. This dealer purchased his charcoal (sometimes by the carlot) from a second fuel and lumber dealer in a nearby city, who had been supplied by a broker. The broker had negotiated directly for charcoal with the manufacturer. In this case five middlemen were involved before the charcoal was finally placed in the hands of the consumer.

Nevertheless, fuel dealers are still the most important type of wholesale distributors. They supplied retailers with about half their sales volume in 1955, while grocery and hardware jobbers shared most of the remaining volume almost equally. Their total volume distribution continued to increase, though at a slower rate than other distributors. Grocers in particular are estimated to have moved twice as much charcoal in 1955 as they did in 1954. Still, retailers credit fuel dealers with being the most dependable source of wholesale supply. Perhaps this is because the source of supply of fuel dealers is more dependable and their growth has been slower than other distributor types, thus subjecting them to less unanticipated demand.

A change is underway. The large short-season volumes which grocery and hardware wholesalers now move are forcing the issue. As manufacturers increase their warehouse capacity for supplying seasonal demand, direct shipments to these large distributors are being given increasing priority. This may eventually eliminate established distributors who supplied many of these sources during their early growth.

Product Form and Packaging

Charcoal is marketed both as it comes from the kiln or retort and in a pressed or briquetted form (fig. 5). An estimated three-quarters of the 1955 sales volume was briquetted, with the remainder sold in chunks or lumps. Both forms were available in a variety of package sizes.

Figure 5.--Examples of the two forms in which charcoal is marketed for domestic consumption. On the left are several chunks of charcoal as they come from the kiln. On the right is charcoal in its briquetted form.

The most commonly available package sizes were 21-ounce [5/], the new 3-pound utility boxes, and the 5-, 10-, 20-, 25-, 40-, and 50-pound paper bags (fig. 6). In 1955, 10-pound paper bags were by far the biggest seller, accounting for about half of all volume sold. Five-pound bags accounted for nearly one-quarter of the total volume sales, as did the 20- and 25-pound bags combined. Both the 21-ounce box and the 50-pound bag were relatively unimportant.

Figure 6.--These are five popular package sizes. In the back from left to right are the 25-, 20-, and 10-pound bags. In front are the 5-pound bag and the recently introduced 3-pound utility box.

Availability of charcoal in 2 forms and 5 major package sizes raises questions concerning consumer preference. Checks of retail stores gave little information on this, for it is a rare store that carries both forms of charcoal in their full range of available package sizes. Because a complete line of merchandise is so rarely on display, purchases made by customers do not accurately reflect their preference in charcoal use (table 2).

5/ Many, if not all, of these packages are believed to have contained anthracite coal rather than charcoal but are included here because users thought they were purchasing charcoal.

Table 2.--Availability of charcoal by form and package size for all stores selling charcoal in Wisconsin, 1955

Package size	Percent of charcoal retailers carrying charcoal in:		
	Briquette form	Lump form	Both forms
21-ounce box	15	1/	1/
5-pound bag	25	34	4
10-pound bag	63	7	2
20 & 25-pound bags	23	2	1
40 & 50-pound bags	4	1/	1/

1/ Available in briquetted form only.

Charcoal Sales and City Size

Per capita sales of charcoal seem to vary by city size. The small cities generally show a higher consumption rate than do larger ones or very small communities. About one-half of the estimated volume sold in 1955 was sold in cities of less than 10,000 people, even though these cities include only about one-third of the State's urban population. These smaller communities are also experiencing more rapid sales growth than larger ones.

Much of the higher per capita consumption found in smaller towns is due to concentrations of tourist population during the summer vacation season. Many resort towns more than double in population during this period, which coincides well with the season of high charcoal use. During 1955, an estimated 90 percent of packaged charcoal was sold from June through September.

Distribution problems also vary with city size. Charcoal procurement was not a serious problem for most retailers during 1955, although all store types in all city sizes experienced some shortage of supplies. However, the retailers in smaller towns were out of charcoal longer and more often than were their counterparts in larger cities. One cause of this situation is the usual tight midseason charcoal supply combined with the central big-city location of distributors. These problems of supply, however, are diminishing as production increases.

Summary and Conclusions

1. The rapidly rising popularity of charcoal used for outdoor cooking has led, in recent years, to a sharp increase in consumption during the warm weather period from June to September. Charcoal sales in Wisconsin increased by about 50 percent from 1954 to 1955 and many indications point to an eventual use substantially greater than the present one pound per person per year.

2. Nationally, 60 percent of the charcoal manufactured is consumed in the highly seasonal domestic market. This has created a severe storage problem for large wood distillation plants which produce approximately two-thirds of the total and are attempting to shift the bulk of their production from industrial to domestic markets.

3. Yearly midseason domestic shortages and higher prices are encouraging kiln construction for additional charcoal production. Since 1950, 122 units have been placed in operation in Michigan, Minnesota, and Wisconsin and additional units are planned in each State.

4. The charcoal retail market structure in Wisconsin has changed significantly since 1950. Fuel dealers predominated as distributors before the present upward surge in domestic use began. Grocers now have the lead and are expected to increase it because they possess at least two distinct advantages over other merchants: First, they are able to sell at lower prices due to higher sales volume, rapid turnover, and low overhead. Second, the consumer prefers the one-stop shopping convenience of buying charcoal at the same place he buys the meat and other foodstuffs used with it.

5. Charcoal wholesale distribution has changed, but not rapidly enough to keep pace with the changing retail pattern. The major shortcoming of distributors has been to encourage the introduction of additional middlemen who, in many cases, might be unnecessary in a more efficient system. This condition is basically attributable to inadequate storage facilities and will likely disappear as more facilities become available.

6. Fuel dealers are the most important wholesale group. They handle about as much charcoal as do grocery and hardware jobbers together. Wholesale grocers and hardware jobbers are of about equal importance in the present market, but grocers are increasing their volume faster than any other wholesale group.

7. More charcoal was sold in 1955 in the briquetted form and in 10-pound bags than in any other combination of form and bag size. This, however, does not establish consumer preference, for charcoal was rarely available in the full range of form and bag sizes necessary to give buyers a choice.

8. Per capita charcoal sales vary by city size. Small towns show a higher figure and a more rapid sales growth than do the larger cities. Behind this lies the importance of tourist trade to the economy of many smaller Wisconsin communities--particularly those in the State's recreational and resort areas.

9. The market for domestic charcoal may be expected to strengthen in the years to come, although it will retain its seasonal character. A thriving charcoal industry in the Lake States will offer a welcome market for presently unmerchantable roundwood and a variety of wood-industry scraps.

SOME RECENT STATION PUBLICATIONS

Oak Wilt Damage, A Survey in Central Wisconsin.
R. L. Anderson and D. D. Skilling.
Station Paper 33, 11 pp., illus. 1955.

Forest Management Lessons from a 1949 Windstorm in Northern Wisconsin and Upper Michigan.
J. H. Stoeckeler and Carl Arbogast, Jr.
Station Paper 34, 11 pp. 1955.

The Timber Resource of North Dakota.
John R. Warner and Clarence D. Chase.
Station Paper 36, 39 pp., illus. 1956.

Lake States Timber Resources.
R. N. Cunningham and Survey Staff.
Station Paper 37, 31 pp. 1956.

Properties of 160 Soils of Four North Central States.
John L. Thames and Edmond I. Swensen.
Station Paper 38, 6 pp. and 5 tables, illus. 1956.

Publications of the Lake States Forest Experiment Station.
L. P. Olsen and H. A. Woodworth.
Station Paper 39, 130 pp. 1956.

Guide for Selecting Superior Forest Trees and Stands in the Lake States.
Paul O. Rudolf.
Station Paper 40, 32 pp., illus. 1956.

Chemical Control of Brush and Trees in the Lake States.
Paul O. Rudolf and Richard F. Watt.
Station Paper 41, 58 pp., illus. 1956.

The Forest Insect and Disease Situation, Lake States, 1956.
L. C. Beckwith and R. L. Anderson.
Station Paper 42, 26 pp., illus. 1956.

Wood Pallets in the Minneapolis-St. Paul Area: An Outlet for Low-Grade Hardwoods.
John R. Warner and D. R. Cowan.
Station Paper 43, 34 pp., illus. 1956.